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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,517	02/14/2001	Michael Scalora	1659.088001/MVM/AJF	7518

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EXAMINER	
KIM, RICHARD H	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 10/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/782,517	SCALORA ET AL.	
	Examiner	Art Unit	
	Richard Kim	2871	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9 and 15-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara et al. (US 5,844,649) in view of Bloemer et al. (July 1998).

Referring to claims 1-9 and 24, Yamahara et al. discloses an LCD device comprising a first and second spaced transparent electrodes being constructed and arranged to have a voltage applied across the first and second transparent electrodes (see Fig. 1, ref. 10, 13 and 16); and a liquid crystal layer positioned between the first and second transparent electrodes for selectively displaying the image in response to the voltage applied across the first and second electrodes (see Fig. 1, ref. 8). However, the reference does not disclose that the first transparent electrode includes a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum, wherein the transparent metal stack includes a first metal layer having a first metal thickness; a first interstitial layer having a first interstitial thickness formed on the first metal layer; a second metal layer having a second metal thickness formed on the first interstitial layer; a second interstitial layer having a second interstitial thickness formed on the second metal layer; and a third metal layer having a third metal thickness formed on the second interstitial layer,

wherein an arrangement of the metal layer and the interstitial layers exhibit the photon band gap structure, wherein a third interstitial layer having a third interstitial thickness is formed on the third metal layer, wherein the first, second, and third metal layers are silver, wherein the first, second and third metal thicknesses are each between 2.5 to 5 nm and approximately 40 to 60 nm, wherein the first and second interstitial layers comprise Magnesium Fluoride and wherein the first transparent electrode has a conductivity of at least two orders of magnitude greater than ITO.

Bloemer et al. discloses a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure (see page 218) for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum (see page 222), wherein the transparent metal stack includes a first metal layer having a first metal thickness; a first interstitial layer having a first interstitial thickness formed on the first metal layer; a second metal layer having a second metal thickness formed on the first interstitial layer; a second interstitial layer having a second interstitial thickness formed on the second metal layer; and a third metal layer having a third metal thickness formed on the second interstitial layer, wherein an arrangement of the metal layer and the interstitial layers exhibit the photon band gap structure, wherein a third interstitial layer having a third interstitial thickness is formed on the third metal layer, wherein the first, second, and third metal layers are silver, wherein the first, second and third metal thicknesses are each between 2.5 to 5 nm and approximately 40 to 60 nm, wherein the first and second interstitial layers comprise Magnesium Fluoride (see page 218), wherein the

first transparent electrode has a conductivity of at least two orders of magnitude greater than (see page 222).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first transparent electrode includes a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum wherein the transparent metal stack includes a first metal layer having a first metal thickness; a first interstitial layer having a first interstitial thickness formed on the first metal layer; a second metal layer having a second metal thickness formed on the first interstitial layer; a second interstitial layer having a second interstitial thickness formed on the second metal layer; and a third metal layer having a third metal thickness formed on the second interstitial layer, wherein an arrangement of the metal layer and the interstitial layers exhibit the photon band gap structure wherein a third interstitial layer having a third interstitial thickness is formed on the third metal layer wherein the first, second, and third metal layers are silver, wherein the first, second and third metal thicknesses are each between 2.5 to 5 nm and approximately 40 to 60 nm and wherein the first and second interstitial layers comprise Magnesium Fluoride wherein the first transparent electrode has a conductivity of at least two orders of magnitude greater than ITO. According to Bloemer et al., such a modification would increase the conductivity "three orders of magnitude greater than ITO" (see page 222, paragraph 4), thereby requiring less power to drive the display.

Referring to claim 15, Yamahara et al. and Bloemer et al. disclose the device previously recited. However, Yamahara et al. does not disclose a plurality of metal layers having the first

metal thickness, wherein the second and third metal thickness are equal the first metal thickness; and a plurality of interstitial layers having the first interstitial thickness, wherein the second and third interstitial thickness equals the first interstitial thickness, wherein the plurality of metal and interstitial layers are arranged in an alternating manner, and wherein the plurality of metal and interstitial layers corresponds to the visible and non-visible wavelength ranges.

Bloemer et al. discloses a plurality of metal layers having the first metal thickness, wherein the second and third metal thickness are equal the first metal thickness; and a plurality of interstitial layers having the first interstitial thickness, wherein the second and third interstitial thickness equals the first interstitial thickness, wherein the plurality of metal and interstitial layers are arranged in an alternating manner, and wherein the plurality of metal and interstitial layers corresponds to the visible and non-visible wavelength ranges (see page 218).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a plurality of metal layers having the first metal thickness, wherein the second and third metal thickness are equal the first metal thickness; and a plurality of interstitial layers having the first interstitial thickness, wherein the second and third interstitial thickness equals the first interstitial thickness, wherein the plurality of metal and interstitial layers are arranged in an alternating manner, and wherein the plurality of metal and interstitial layers corresponds to the visible and non-visible wavelength ranges in order to create a device with high "transmittance in the pass band" and "filter unwanted wavelength" (see abstract), thereby creating an illuminated display while preventing the transmission of harmful radiation.

Referring to claim 16, Yamahara et al. discloses the device comprising first and second signal lines, respectively connected to the first and second electrodes, for applying the voltage

across the first and second electrodes (see col. 3, lines 48-56). However, the reference does not disclose that the first signal line is connected to at least one of the alternating metal layers of the transparent metal stack.

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first signal line to be connected to at least one of the alternating metal layers of the transparent metal stack in order to have a point of electrical contact, thereby enabling voltage to be applied across the electrodes.

Referring to claim 17, Yamahara et al. and Bloemer et al. disclose the device previously recited. However, the reference does not disclose that the second electrode includes a transparent metal stack having a layered structure including alternating metal and interstitial layer from on one another to exhibit a PBG structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the second electrode to include a transparent metal stack having a layered structure including alternating metal and interstitial layer from on one another to exhibit a PBG structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range since one would be motivated to further employ the advantage of the PBG structure to the second electrode, thereby enabling greater transmittance through the device, further increasing the conductivity of "three orders of magnitude greater than ITO" (see page 222, paragraph 4), thereby requiring even less power to drive the display.

Referring to claim 18, Yamahara et al. disclose the device further comprising a first and second LC aligning layers, respectively positioned adjacent the first and second transparent

electrodes and in contact with the LC layer, for aligning LCD molecules in the LCD layer in predetermined directions (see Fig. 1, ref. 11, 14), a first transparent substrate for supporting the first transparent electrode (see Fig. 1, ref. 12); a second transparent substrate and a color filter for supporting the second transparent substrate (see Fig. 23, ref. 9 and 73); and first and second polarizing filter respectively overlaying the outer surface of the first and second transparent substrates (see Fig. 1, ref. 4, 5).

Referring to claims 19-23, Yamahara et al. discloses the device previously recited. Yamahara et al. further discloses that a Twisted Nematic LCD device, wherein an orientation of LC molecules in the LC layer twists or rotates through an angle of 90 degrees across the LC layer, and an LCD device wherein the LCD device is STN (see col. 13, lines 34-43). However, the reference does not disclose that the device is DSTN, Triple Super Twisted Nematic or is a Film Compensated Super Twisted Nematic LCD device, wherein a plastic film is used as a compensator.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a device that is DSTN, Triple Super Twisted Nematic or is a Film Compensated Super Twisted Nematic LCD device, wherein a plastic film is used as a compensator since applicant has claimed numerous LCD modes and is therefore not a critical feature of the invention. As a result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used any desirable mode for the LCD device.

Referring to claims 25, 27 and 28, Yamahara et al. discloses a transparent substrate (see Fig. 1, ref. 12); a matrix of transparent pixel electrodes formed on the transparent substrate (see Fig. 1, ref. 13); a switching device associated with each pixel electrode and being constructed

and arranged to selectively apply a first voltage to the pixel electrode (see col. 13, lines 44-47; Fig. 1, ref. 16); a transparent common electrode layer spaced apart from the matrix of pixel electrodes and being constructed and arranged to have a second voltage applied thereto (see Fig. 1, ref. 10); and a liquid crystal layer positioned between the common electrode layer and the matrix of the pixel electrodes to form a corresponding matrix of LC image pixel (see Fig. 1, ref. 8), whereby each image pixel in the matrix of image pixels selectively transmits light in response to voltage applied across the image pixel by the common electrode and an associated pixel electrode to form an image on the display (see col. 14, lines 16-34). However, the reference does not disclose a device comprising transparent pixel electrodes and the common electrode including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum, wherein conductivity of each transparent electrode is at least two orders of magnitude greater than a conductivity of ITO.

Bloemer et al. discloses a device including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum (see page 222, 218), wherein the first transparent electrode has a conductivity of at least two orders of magnitude greater than ITO (see page 222).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a transparent metal stack having a layered structure including

alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum, wherein the first transparent electrode has a conductivity of at least two orders of magnitude greater than ITO since such a modification would increase the conductivity "three orders of magnitude greater than ITO" (see page 222, paragraph 4), thereby requiring less power to drive the display.

Referring to claim 26, Yamahara et al. discloses a device comprising a plurality of scanning lines formed in a first direction on the substrate; and a plurality of data lines formed in a second direction on the substrate such that the scanning lines and the data lines cross-over each other, and wherein each switching device is formed at a cross-over portion between one of the scanning lines and one of the data lines, the switching device including first and second control inputs connected respectively to the one of the data lines and one of the scanning lines, and an output connected to the pixel electrode for selectively applying a voltage to the pixel electrode in response to voltage signals on the one of the scanning lines (col. 14, lines 17-34).

Referring to claims 29 and 30, Yamahara et al. discloses a device and method comprising a plurality of transparent first electrodes supported by a first substrate and extending in a first direction, the first electrode being constructed and arranged to have a first voltage applied to selected ones of the first electrodes; a plurality of transparent second electrodes supported by a second substrate and spaced apart from the first electrodes, the second electrodes extending in a second direction to cross-over the row electrodes being constructed and arrange to have a second voltage applied to selected ones of the second electrodes (see col.14, lines 8-34); and a liquid crystal layer positioned between the first and second electrodes and forming a matrix of LC pixel

regions corresponding to the cross over positions between the first and second electrodes, wherein each of the LC pixel regions selectively transmits light in response to a voltage applied across the pixel regions resulting form the first and second voltages, to thereby from an image (see col. 14, lines 8-34; Fig. 17, ref. 55). However, the reference does not disclose that each of the first electrodes include a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum.

Bloemer et al. discloses a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum (see page 222).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for each of the first electrodes to include a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum since such a modification would increase the conductivity "three orders of magnitude greater than ITO" (see page 222, paragraph 4), thereby requiring less power to drive the display.

3. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara et al. and Bloemer et al. (July 1998), in view of Bloemer et al. (April 1998).

Referring to claim 10, Yamahara et al. and Bloemer et al. disclose the device previously recited. However, the reference does not disclose that the first interstitial layer thickness is one of between approximately 2.5 to 5 nm and greater than 5 nm, the second interstitial thickness is one of between approximately 300 to 500 nm and greater than 500 nm.

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first interstitial layer thickness to be one of between approximately 2.5 to 5 nm and greater than 5 nm, the second interstitial thickness one of between approximately 300 to 500 nm and greater than 500 nm since one would be motivated to create a device with high "transmittance in the pass band" and "filter unwanted wavelength" (see abstract). According to Bloemer et al. (April 1998), "it is possible to design a 1D MD-PBG with single pass band in the visible and block all other radiation to static to soft x rays" (see page 1676, column 2). Therefore, adjusting the thickness of the interstitial layers and the metal layers in order to achieve optimum transmissive properties requires routine skill in the art.

Referring to claims 11-13, Yamahara et al. and Bloemer et al. disclose the device previously recited. However, the reference does not disclose that the non-visible wavelength range comprises the infrared region, the UV region or the infrared region to the microwave region of the electromagnetic spectrum.

Bloemer et al. (April 1998) discloses a photonic band gap device capable of blocking non-visible wavelength in the infrared region, the UV region or the infrared region to the microwave region of the electromagnetic spectrum (see page 1676, col. 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the non-visible wavelength range comprises the infrared region, the UV

region or the infrared region to the microwave region of the electromagnetic spectrum in order to prevent harmful radiation from being emitted from the device.

Referring to claim 14, Yamahara et al. and Bloemer et al. disclose the device previously recited. However, Yamahara et al. does not disclose that the first, second, and third metal layer thicknesses are each approximately 27.5 nm, wherein the first and second interstitial layers are each approximately 156 nm, wherein the visible wavelength range comprises the group of wavelength between approximately 400 and 700 nm, wherein the non-visible wavelength comprise the IR and the microwave wavelength regions, and wherein the transmission of the visible wavelength range corresponds to at least approximately 40 percent transmission and the transmission of the non-visible wavelength range corresponds to approximately 10^{-5} transmission.

Bloemer et al. (July 1998) discloses that the first, second and third metal layer thicknesses are each approximately 27.5 nm, wherein the first and second interstitial layers are each approximately 156 nm, wherein the visible wavelength range comprises the group of wavelengths between approximately 400 and 700 nm (see page 218), wherein the transmission of the visible wavelength corresponds to at least approximately 40 percent transmission (see page 218). Bloemer et al. (April 1988) discloses that the non-visible wavelength range comprises the IR and microwave wavelength region (see page 1676, col. 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first, second, and third metal layer thickness are each approximately 27.5 nm, wherein the first and second interstitial layers are each approximately 156 nm, wherein the visible wavelength range comprises the group of wavelength between approximately 400 and

700 nm, wherein the non-visible wavelength comprise the IR and the microwave wavelength regions, and wherein the transmission of the visible wavelength range corresponds to at least approximately 40 percent transmission and the transmission of the non-visible wavelength range corresponds to approximately 10^{-5} transmission since one would be motivated to create a device with high "transmittance in the pass band" and "filter unwanted wavelength" (see abstract). According to Bloemer et al. (April 1998), "it is possible to design a 1D MD-PBG with single pass band in the visible and block all other radiation to static to soft x rays" (see page 1676, column 2). Therefore, designing the layer in order to optimally be transmissive to visible light and block other radiation would require routine skill in the art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Kim whose telephone number is (703)305-4791. The examiner can normally be reached on 9:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703)305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Richard Kim
Examiner
Art Unit 2871

Primary Examiner

RHL